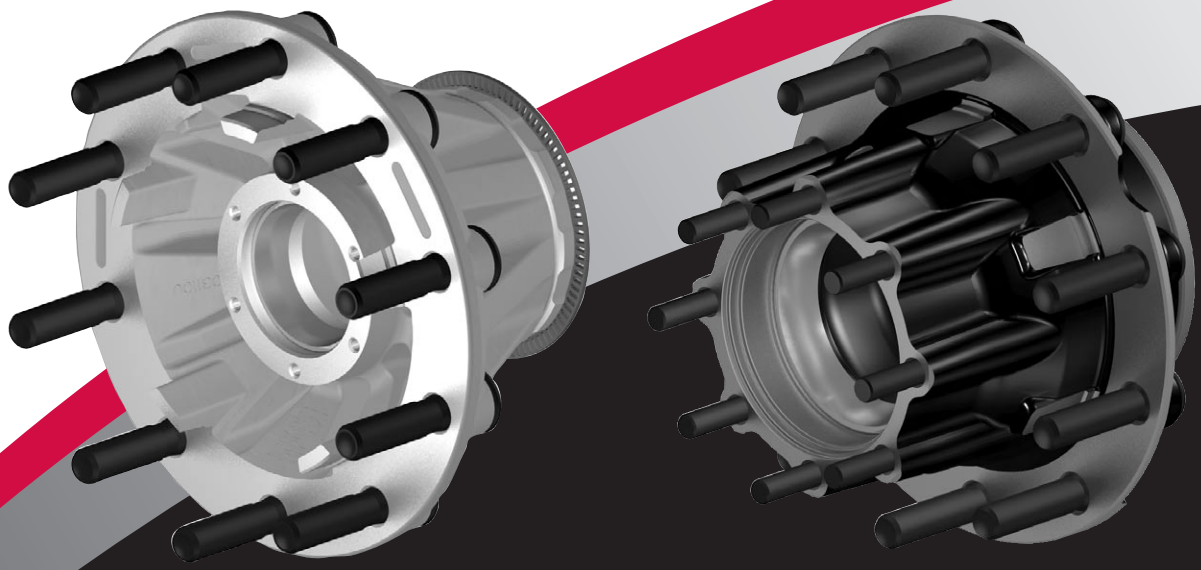
Service Manual

for ConMet® Hub Assemblies



Aluminum Hub

Iron Hub

Steer, Drive and Trailer Hubs with Manually Adjusted Bearings

CONMET®

Pointing the Way™

NOTES

About This Manual

- Read this manual carefully, providing extra attention to its explanations and instructions.
- To ensure safe, continuous, trouble-free operation, understand your wheel hub system, and keep all components in proper operating condition.
- Pay particular attention to all NOTES, CAUTIONS, WARNINGS, and DANGERS to avoid the risk of personal injury or property damage, and realize these statements are not exhaustive. ConMet cannot possibly know or evaluate all conceivable methods in which service may be performed or the possibly hazardous consequences of each method. Accordingly, those who use a procedure not recommended by ConMet must first satisfy themselves that neither their safety nor the safety of the product will be jeopardized by the service method selected.
- Use only ConMet approved replacement parts. Do not attempt to use damaged parts.

Before You Begin

1. Read and understand all instructions and procedures before you begin to service components.
2. Read and observe all Warning and Caution hazard alert messages in this publication. They provide information that can help prevent serious personal injury, damage to components, or both.
3. Follow your company's maintenance and service, installation, and diagnostics guidelines.
4. Use special tools when required to help avoid serious personal injury and damage to components.

Hazard Alert Messages

⚠ DANGER

Activities associated with ***Danger*** indicate that death or serious personal injury may result from failing to heed the advisory. Serious personal injury may be equated to career-ending injury.

⚠ WARNING

Activities associated with ***Warning*** indicate that personal injury may result from failing to heed the advisory. In this case, personal injury is not equated to career-ending injury, but results in possible change in quality of life.

⚠ CAUTION

Activities associated with ***Caution*** indicate that product damage may result from failing to heed the advisory. Caution is not used for personal injury.

NOTE

A note includes additional information that may assist the technician in service procedures.

How to Obtain Additional Maintenance and Service Information

On the Web

Visit www.conmet.com to access ConMet's product, sales, service and maintenance literature.

ConMet Customer Service

Call ConMet's Customer Service at 1-800-547-9473.

TABLE OF CONTENTS

INTRODUCTION 1
IDENTIFICATION 2
WHEEL MOUNTING SYSTEMS 2
Hub Pilot Wheel Mounting 2
Ball Seat Wheel Mounting System 2
PERIODIC INSPECTION 3
HAZARD ALERT MESSAGES 3
INSPECTION GUIDELINES 3
Driver Pre-Trip Visual Inspection 3
In Conjunction with Preventative Maintenance Schedule 3
TWELVE (12) MONTH INSPECTION 4
EVERY 12 MONTHS OR 100,000 MILES (WHICHEVER OCCURS FIRST) 4
Inspect Components 4
Inspect for Leaks 4
Inspect for Proper Lubricant Level and Condition 4
Functional Checks 5
Check End Play 5
RECOMMENDED SERVICE 6
HUB REMOVAL AND DISASSEMBLY 6
COMPONENT INSPECTION AND REPLACEMENT
HAZARD ALERT MESSAGES 7
CLEAN, DRY AND INSPECT COMPONENTS 7
Worn or Damaged Components 7
Hub and Component Cleaning 7
INSPECTION AND TROUBLESHOOTING 8
Bearing Cups and Cones 8
REMOVING CUPS IN ALUMINUM HUBS 8
REMOVING CUPS IN IRON HUBS 9
INSTALLING A NEW CUP IN ALUMINUM HUBS 9
INSTALLING A NEW CUP IN IRON HUBS 9
WHEEL STUDS 9
STUD REMOVAL 9
STUD REPLACEMENT 9
HUB, DRUM AND WHEEL INSPECTION 10
ABS TONE RING INSPECTION (AS APPLICABLE) 10
REMOVAL AND INSTALLATION OF POWDERED METAL ABS TONE RING 10
REMOVAL AND INSTALLATION OF STAMPED STEEL ABS TONE RING 10
REASSEMBLY 12
REINSTALLATION 13
INSTALLING THE WHEEL HUB ASSEMBLY 13
INSTALLING THE HUB CAP 14
STEER AND TRAILER HUBS WITH OIL LUBRICANT 14
TRAILER HUBS WITH SEMI-FLUID GREASE LUBRICANT 14
DRIVE HUBS WITH OIL LUBRICANT 15
REINSTALLING BRAKE DRUMS AND WHEELS 15
Hub Pilot Wheel Mounting System 15
Ball Seat Wheel Mounting System 17
SPECIFICATIONS 19
Wheel End Torque Specifications 19
Manual Wheel Bearing Adjustment Procedure TMC RP618 20

INTRODUCTION

Consolidated Metco, Inc. is recognized as the leader in the design and manufacture of lightweight/low maintenance components for the commercial vehicle industry. ConMet® wheel hub assemblies offer superior performance and durability. ConMet® recommends TMC RP618 for manual bearing adjustment. The procedures for bearing adjustment outlined in this manual are based on this recommended practice. For single-piece nut systems, refer to that manufacturer's recommended adjustment procedure.

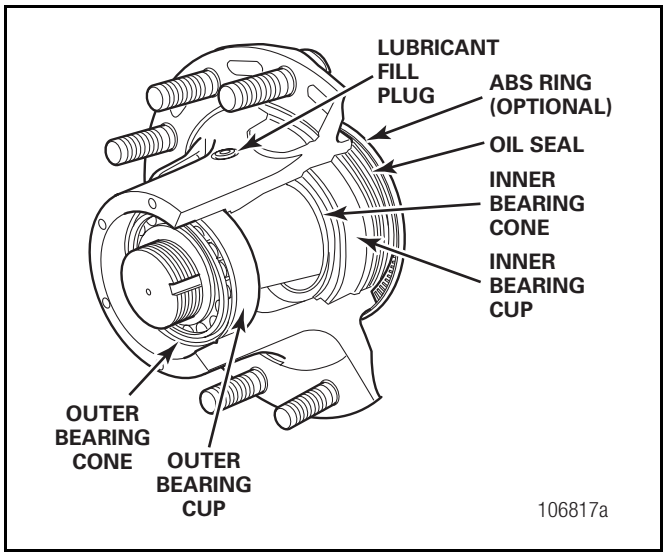
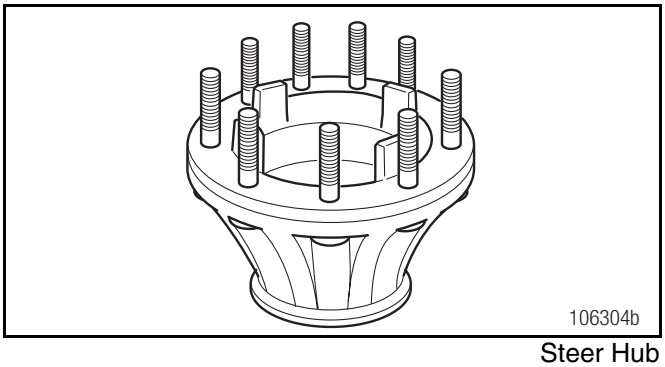


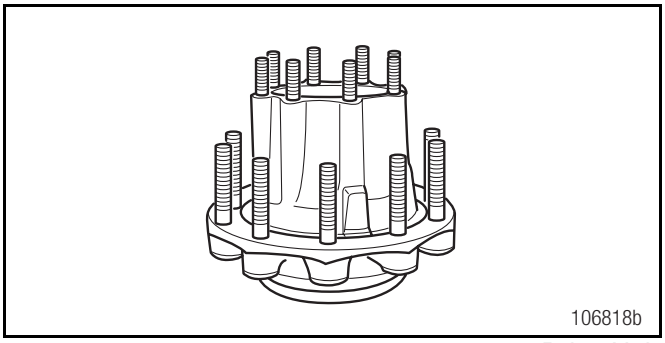
FIGURE 1

IDENTIFICATION

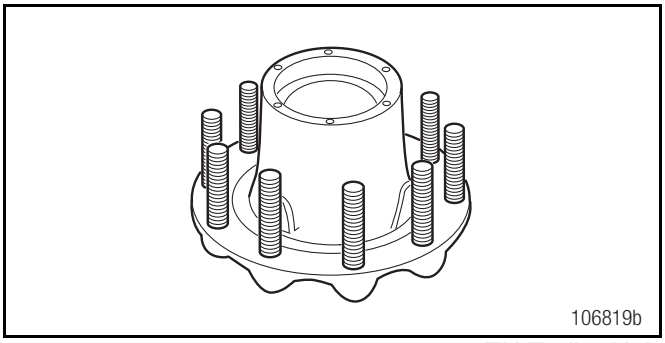
ConMet offers a complete family of aluminum and ductile iron wheel hub assemblies for steer, drive and trailer axles.



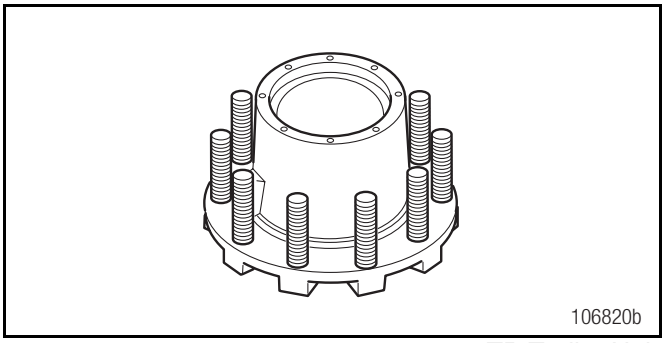
Steer Hub
FIGURE 2



Drive Hub
FIGURE 3



TN Trailer Hub
FIGURE 4



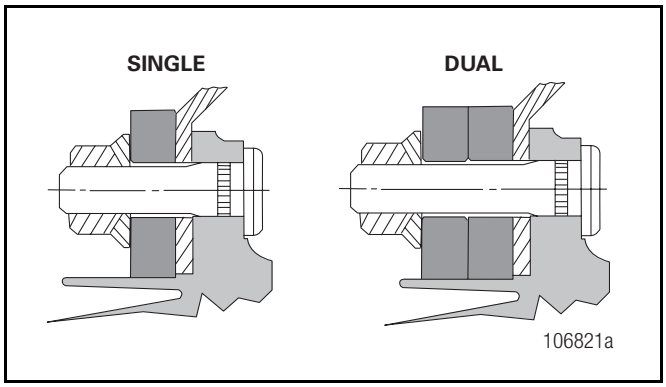
TP Trailer Hub
FIGURE 5

WHEEL MOUNTING SYSTEMS

ConMet wheel hubs are available in both hub pilot and ball seat nut configurations.

Hub Pilot Wheel Mounting

The hub pilot wheel mounting system makes use of a single two-piece flange nut on each wheel stud for both single and dual wheel applications (see figure 6). The hub pilot wheel mounting system is also known as the Uni-Mount-10™ (10 stud), WHD-10™ (10 stud), WHD-8™ (8 stud), and ISO system.

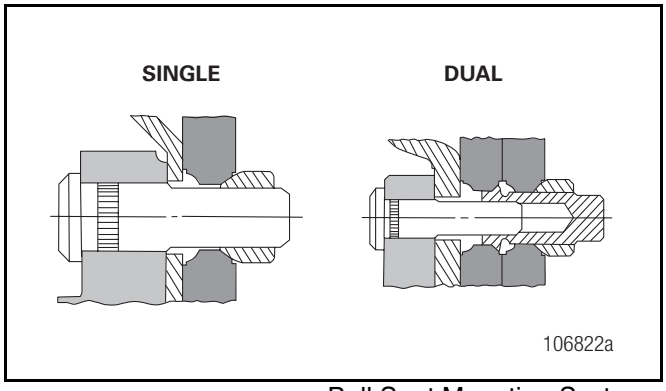


Hub Pilot Mounting Systems
FIGURE 6

Ball Seat Wheel Mounting System

The ball seat wheel mounting system makes use of the spherical contact area between the nut and wheel to both locate the wheel and hold the wheel tight against the brake drum (see figure 7).

The ball seat wheel mounting system is also known as the stud piloted, ball seat cap nut (BSN) and double cap nut (DCN) system.



Ball Seat Mounting Systems
FIGURE 7

PERIODIC INSPECTION

HAZARD ALERT MESSAGES

Read and observe all Warning and Caution hazard alert messages in this publication. They provide information that can help prevent serious personal injury, damage to components, or both.

⚠ WARNING

Do not work under a vehicle supported only by jacks. Jacks can slip and fall over. Serious personal injury and damage to components can result.

To prevent serious eye injury, always wear safe eye protection when you perform vehicle maintenance or service.

Park the vehicle on a level surface. Block the wheels to prevent the vehicle from moving. Support the vehicle with safety stands.

INSPECTION GUIDELINES

Follow this schedule of inspection and maintenance for hub assemblies.

Driver Pre-Trip Visual Inspection

(Each time prior to operating the vehicle on the road)

With vehicle parked on level ground and the parking brake set, walk around the vehicle and visually inspect each wheel assembly for the following items:

- Loose, damaged or missing fasteners
- Loose, damaged or missing hubcaps
- Oil leaks at hubcap, axle flange gasket or fill plug
- Oil level and condition
- Lubricant on the hub, brake components or inside of wheel and tire

If any of the above conditions are found, the vehicle should be placed out of service until the item can be repaired.

In Conjunction with Preventative Maintenance Schedule

- Check all items listed in the driver pre-trip visual inspection.
- Lift and support the axle and rotate the wheel. Check that the wheel rotates freely. Listen and feel for any signs of rough bearing operation or vibration.

TWELVE (12) MONTH INSPECTION

EVERY 12 MONTHS OR 100,000 MILES (WHICHEVER OCCURS FIRST)

⚠ WARNING

Vehicles on jacks can fall, causing serious personal injury or property damage.

Never work under a vehicle supported by a jack without supporting the vehicle with stands and blocking the wheels.

1. Wear safe eye protection.
2. Park the vehicle on a level surface. Block the wheels to prevent the vehicle from moving.
3. Raise the axle until the tires are off the floor.
4. Place safety stands under the trailer frame or under each axle spring seat (see figure 8).

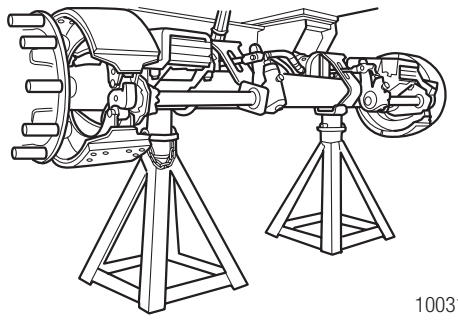


FIGURE 8

5. Remove the tire and wheel assembly using procedures specified by the wheel manufacturer (see figure 9).

FIGURE 9

Inspect Components

Check for the following:

- Loose, damaged or missing fasteners
- Loose, damaged or missing hubcaps

Inspect for Leaks

1. Check that no lubricant is present around the hubcap or on the wheel.
   - If lubricant is present, investigate the cause and take corrective action.
2. Check that no lubricant is present on the hub, brake hardware or brake shoes.
   - If lubricant is present, check the inboard seal.

Inspect for Proper Lubricant Level and Condition

1. Allow any air in the lubricant to escape prior to inspection. Visually inspect the lubricant for discoloration. Under normal conditions, the lubricant will darken. A white or milky appearance indicates water contamination.
2. Visually inspect the lubricant for foreign materials such as metal shavings, rust or other contaminants. A magnet can be used to detect any metallic materials that may be present in the lubricant.
3. If the inspection indicates contamination, service the wheel hub according to instructions outlined later in this manual.

⚠ CAUTION

Do not mix different types of lubricants. Only use lubricants approved by the seal manufacturer.

NOTE

On wheel ends filled with semi-fluid grease, remove the hubcap and verify that sufficient grease is flowing through the bearing rollers and that the ends of the bearing are lubricated. Check to be sure there are no signs of contamination present. If additional grease is required, use the fill hole in the barrel of the hub to add additional grease until grease flows from the outboard bearing.

TWELVE (12) MONTH INSPECTION

Functional Checks

Rotate the hub and check for free, smooth, and quiet rotation. If rotation is hampered, hubs should be serviced immediately.

Check End Play

1. Remove the hubcap or drive axle. Attach the magnetic base of the dial indicator to the spindle. Touch the dial indicator stem to the hubcap mounting surface (see figure 10).

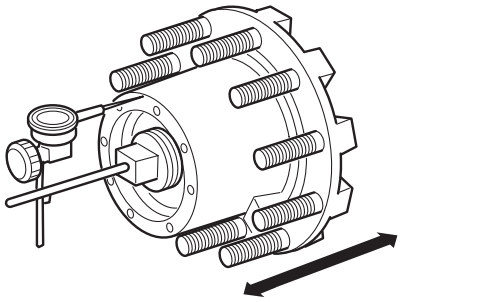


FIGURE 10

2. Grasp two wheel studs across from each other. Pull and push while oscillating the hub.

3. Measure the end play by calculating the difference between the minimum and maximum dial indicator readings.

⚠CAUTION

End play should be between 0.001" and 0.005". If 0.000 is measured, adjustment is required.

NOTE

All components replaced under warranty must be returned for consideration of reimbursement. Contact the OEM for their warranty return policy.

RECOMMENDED SERVICE

The recommended service interval is 500,000 miles or every second brake service for on-highway vocations. In more severe duty applications, this service may be required more often. Your 12 month inspection criteria will give you an indication whether this service is required.

HUB REMOVAL AND DISASSEMBLY

1. Remove the tires and wheels following steps 1-5 in the previous section entitled “TWELVE (12) MONTH INSPECTION”.

⚠ WARNING

Sudden release of compressed air can cause serious personal injury and damage to components.

Before you service a spring chamber, carefully follow the manufacturer’s instructions to compress and lock the spring to completely release the brake. Verify that no air pressure remains in the service chamber before you proceed.

2. If the axle is equipped with spring brake chambers, carefully compress and lock the springs so that they cannot actuate (see figure 11).

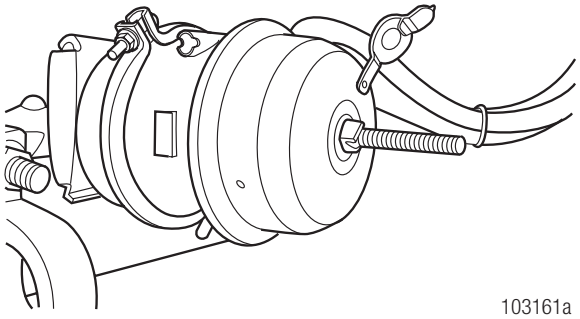
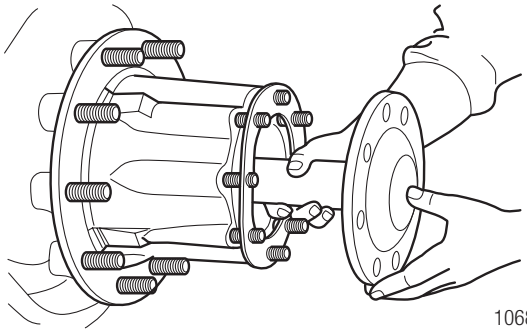


FIGURE 11

3. Remove the brake drum. Support the drum during the removal process to prevent damage to the axle spindle threads.

NOTE

If the hub to be disassembled is a drive hub, remove the drive axle shaft, and capture the oil (see figure 12).



Removing the Drive Axle Shaft
FIGURE 12

4. Place a container under the hubcap, or drive axle shaft for a drive hub, to receive the draining oil, then remove the hubcap or drive axle shaft. Do not reuse the oil. Correctly dispose of the lubricant.

5. Examine the spindle nut to determine the type of locking system. Disengage the locking device.

⚠ WARNING

Do not loosen the axle spindle nuts by either striking them directly with a hammer, or striking a drift or chisel placed against them. Damage to the parts will occur causing possible loss of axle wheel-end components and serious personal injury.

6. Remove the spindle nut system. Be careful when you remove the hub that you do not damage the outer bearing by dropping it on the floor.

    - If part of the seal remains on the spindle, be careful that you do not damage the spindle when you remove it.

7. Slide the hub off the spindle. Remove and save the outer bearing cone.

   - If the hub is difficult to remove because the seal is stuck on the spindle, use a mechanical puller to remove the hub (see figure 13).
   - If part of the seal remains on the spindle, carefully remove the part of the seal that remains on the spindle.

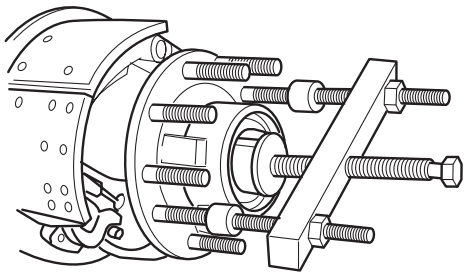
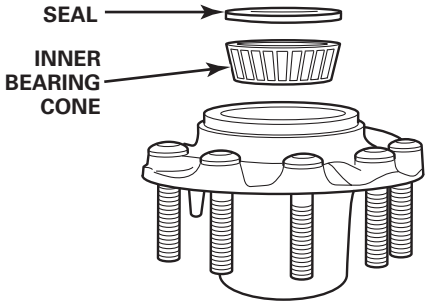


FIGURE 13

8. Place the hub on its outboard end and remove and discard the seal. Be careful not to damage the inner bearing during the removal process (see figure 14).

9. Remove the inner bearing.



Hub Disassembly
FIGURE 14

COMPONENT INSPECTION AND REPLACEMENT HAZARD ALERT MESSAGES

Read and observe all Warning and Caution hazard alert messages in this publication. They provide information that can help prevent serious personal injury, damage to components, or both.

⚠WARNING

To prevent serious eye injury, always wear safe eye protection when you perform vehicle maintenance or service.

Observe all warnings and cautions provided by the press manufacturer to avoid damage to components and serious personal injury.

Do not hit steel parts with a steel hammer. Pieces of a part can break off. Serious personal injury and damage to components can result. Use a brass or synthetic mallet for assembly and disassembly procedures.

Solvent cleaners can be flammable, poisonous and cause burns. Examples of solvent cleaners are carbon tetrachloride, and emulsion-type and petroleum-base cleaners. Read the manufacturer's instructions before using a solvent cleaner, then carefully follow the instructions. Also follow the procedures below.

- Wear safe eye protection.
- Wear clothing that protects your skin.
- Work in a well-ventilated area.
- Do not use gasoline or solvents that contain gasoline. Gasoline can explode.
- You must use hot solution tanks or alkaline solutions correctly. Read the manufacturer's instructions before using hot solution tanks and alkaline solutions. Then carefully follow the instructions.

⚠CAUTION

Do not use hot solution tanks or water and alkaline solutions to clean ground or polished parts. Damage to parts can result.

CLEAN, DRY AND INSPECT COMPONENTS

Worn or Damaged Components

⚠WARNING

Do not repair or recondition wheel-end components. Replace damaged, worn or out-of-specification components. Do not mill or machine any components. Using repaired, reconditioned, damaged or worn components can cause wheel end failure, which can result in serious injury and property damage.

Hub and Component Cleaning

1. Use a cleaning solvent to clean the ground or polished parts and surfaces. Kerosene or diesel fuel can be used for this purpose. DO NOT USE GASOLINE.

2. Do NOT clean ground or polished parts in a hot solution tank or with water, steam or alkaline solutions. These solutions will cause corrosion of the parts.

3. Thoroughly clean the hub cavity with spray degreaser. The cavity must be free of any contaminants.

4. To remove grease from a wheel end, use a stiff fiber brush, not steel, and kerosene or diesel fuel, not gasoline. Allow the parts to dry. Note that any solvent residue must be completely wiped dry since it may either dilute the grease or oil or prevent the lubricant from correctly adhering to the wheel-end components.

5. Clean and inspect the wheel bearings, race, spindle bearing journals and hub. Bearings should be cleaned in a suitable non-flammable solvent and dried with either compressed air or a lint-free rag.

   If compressed air is used, do not spin dry the bearings as the rollers may score due to lack of lubricant. Ensure that the air line is moisture free.

6. Parts must be dried immediately after cleaning. Dry parts with clean paper or rags, or compressed air.

⚠CAUTION

Do not dry bearings by spinning with compressed air because components may become dislodged and possibly cause a personal injury or damage the components.

7. Apply a lubricant to cleaned and dried parts that are not damaged and are to be immediately assembled. Use only the type of lubricant that will be used to lubricate the wheel end. Do NOT apply oil to the brake linings or the brake drums.

8. If the parts are to be stored, apply a good corrosion preventative to all surfaces. Do NOT apply the material to the brake linings or the brake drums. Store the parts inside special paper or other material that prevents corrosion.

INSPECTION AND TROUBLESHOOTING

Bearing Cups and Cones

⚠CAUTION

If you choose to reuse existing bearings at this service, they must be inspected in accordance with the bearing manufacturers recommended guidelines.

⚠CAUTION

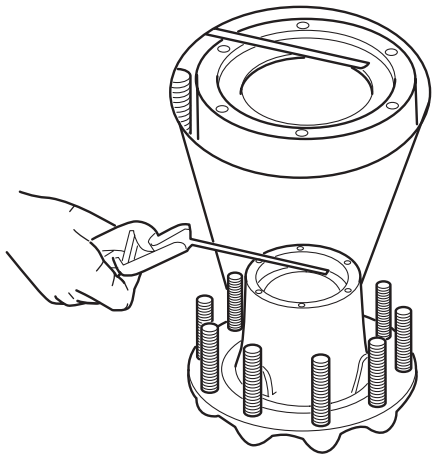
If this inspection indicates that existing bearing component(s) must be replaced, bearing races and bearing rollers must be replaced as a set. Whenever new bearings are installed, replacement of the bearing spacer is also recommended.

REMOVING CUPS IN ALUMINUM HUBS

1. If required on an aluminum hub, remove the bearing cup by welding a large bead around the bearing surface of the steel cup, letting the assembly cool, and removing the bearing cup (see figure 15).

NOTE

If a welder is not available, heat the hub to 300°F and pound out the bearing cups with a hammer and drift being careful not to damage the hub.



Welding Bead
FIGURE 15

2. Inspect the bearing cup bore for evidence of cup rotation or spun cups.
   - If cup rotation exists, replace the hub.

RECOMMENDED SERVICE

REMOVING CUPS IN IRON HUBS

1. On an iron hub, remove the bearing cup using a large hammer and a heavy drift or a hydraulic press. Take precaution to avoid damaging the bearing cup bore and shoulder.
2. Inspect the bearing cup bore for evidence of cup rotation or spun cups.
   - If cup rotation exists, replace the hub.

INSTALLING A NEW CUP IN ALUMINUM HUBS

To install a new cup in an aluminum hub, it is recommended that the hub be heated evenly throughout in an oven at 180°F to 200°F or in boiling water. Cooling the cup in a freezer to 32°F or below will further ease the installation, if desired.

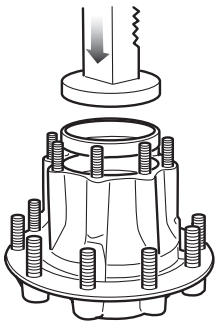
⚠WARNING

Do not overheat the hub.

Remove the aluminum hub from the oven or water and carefully drop in the new bearing cup being certain it is fully seated. If the cup is loose, allow a few seconds for it to heat up and secure itself before moving the hub. Use a 0.001″ feeler gauge to ensure the cup is fully seated against the shoulder of the bearing bore.

INSTALLING A NEW CUP IN IRON HUBS

Iron hubs do not need to be heated for bearing cup installation. Press the bearing cup into the hub being certain that it is fully seated (see figure 16). Use a 0.001″ to 0.002″ feeler gauge to ensure the cup is fully seated against the shoulder of the bearing bore.



Bearing Cup Pressed into Hub
FIGURE 16

WHEEL STUDS

Replace all wheel studs that have damaged or distorted threads, are broken or bent, or are badly corroded. Also, replace both studs adjacent to the damaged stud. If two or more studs have damage, replace all the studs in the hub. Broken studs are usually an indication of excessive or inadequate wheel nut torque.

STUD REMOVAL

⚠WARNING

Observe all warnings and cautions for press operation provided by the press manufacturer to avoid serious personal injury and damage to components.

1. Place the clean hub in a shop press with the hub supported evenly around and adjacent to the stud being removed.

⚠WARNING

Failure to adequately support the hub can result in physical injury and/or damage to the hub.

Some hubs are configured so it is impractical to have supports to prevent the hub from tipping when force is applied to the stud. In this case, support the hub on wood blocks on the floor and use a heavy hammer to drive the studs out with several sharp blows. Be careful to avoid damaging the hub and components, particularly the seal bore and the ABS tone ring.

2. Press the stud out of the hub.

STUD REPLACEMENT

⚠CAUTION

On the ball seat wheel mounting system, always use left-handed threaded studs on left-handed hubs, and use right-handed threaded studs on right-handed hubs.

The ConMet part number is located on the head of the stud. The same part number must be used for replacement unless changing the drum or wheel type.

1. To install a new stud, support the hub evenly around and adjacent to the stud being installed.
2. Press the new stud all the way into the hub. Be sure the stud is fully seated and that the stud head is not embedded into the hub.

⚠WARNING

Excessive force can cause the stud head to be embedded into the hub, which can create a crack in the hub, resulting in serious injury and property damage. If a stud head is imbedded in a hub, replace the hub.

RECOMMENDED SERVICE

HUB, DRUM AND WHEEL INSPECTION

1. Inspect the drum pilots, wheel pilots, and mounting face on the hub for damage. A damaged drum pilot is usually caused by improper drum mounting. A damaged wheel pilot could be the result of inadequate wheel nut torque, allowing the wheels to slip in service.

2. Inspect the wheels and brake drum for damage.

⚠ WARNING

Do not repair or recondition wheel-end components. Replace damaged, worn or out-of-specification components. Do not mill or machine any components. Using repaired, reconditioned, damaged or worn components can cause wheel end failure, which can result in serious injury and property damage.

ABS TONE RING INSPECTION (AS APPLICABLE)

The Anti-Lock Braking System (ABS) acts like any signal generator where the magnet passes a coil and generates a current. On hubs, the toothed ring passes a sensor and generates a signal that is sent to the ABS computer. The computer monitors wheel rotation with the ABS signal and will engage the ABS when no signal is present. There are two types of ABS rings used on ConMet hubs — powdered metal and stamped steel (see figure 17).

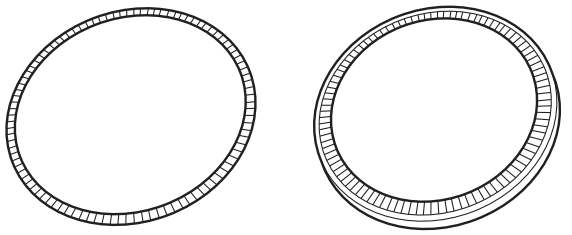
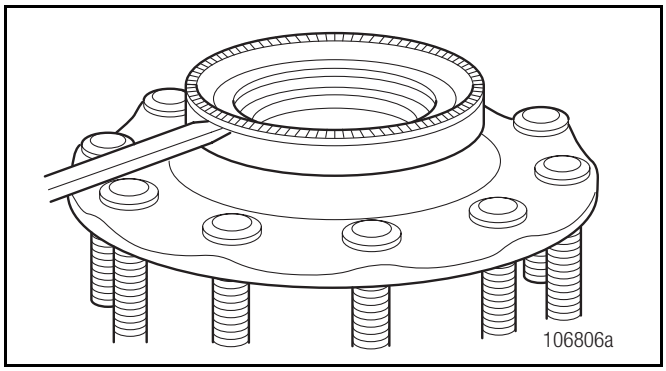


FIGURE 17

If the tone ring is damaged (for example, if it is dropped, bent, chipped or dinged), it must be replaced.

REMOVAL AND INSTALLATION OF POWDERED METAL ABS TONE RING

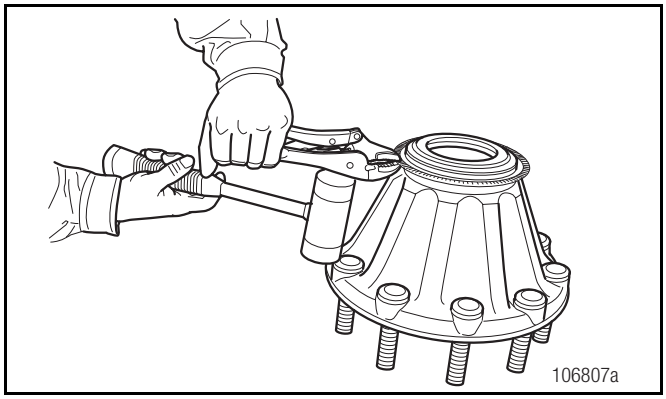
For a powdered metal ring, remove using a chisel, making sure not to damage the hub. Reinstall by heating the ring to 350°F in an oven and installing it on the hub (see figure 18).



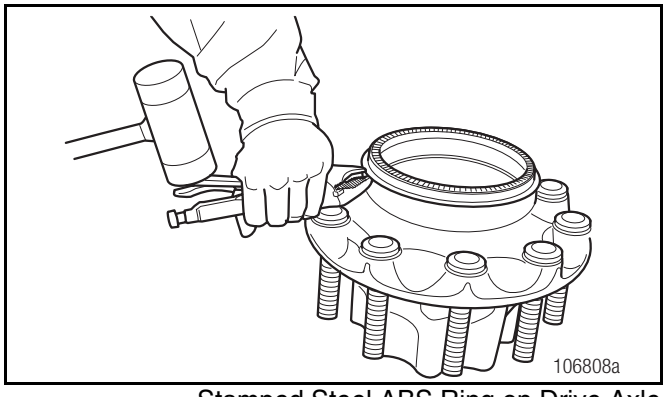
Powdered Metal ABS Ring
FIGURE 18

REMOVAL AND INSTALLATION OF STAMPED STEEL ABS TONE RING

1. The steer axle tone ring can be removed by gripping the ring with a pair of locking pliers and tapping the pliers upward with a rubber mallet. Work around the ring to keep the ring from cocking (see figure 19). Drive axle and trailer tone rings can be removed by gripping the ring with a pair of locking pliers and prying against the head of a wheel stud to lift the ring off the hub. Work around the ring to prevent cocking (see figure 20).



Stamped Steel ABS Ring on Steer Axle
FIGURE 19



Stamped Steel ABS Ring on Drive Axle
FIGURE 20

2. Thoroughly clean and degrease the ABS ring seat on the hub with a nonflammable solvent.

⚠CAUTION

Replace the hub if the ABS ring seat is damaged.

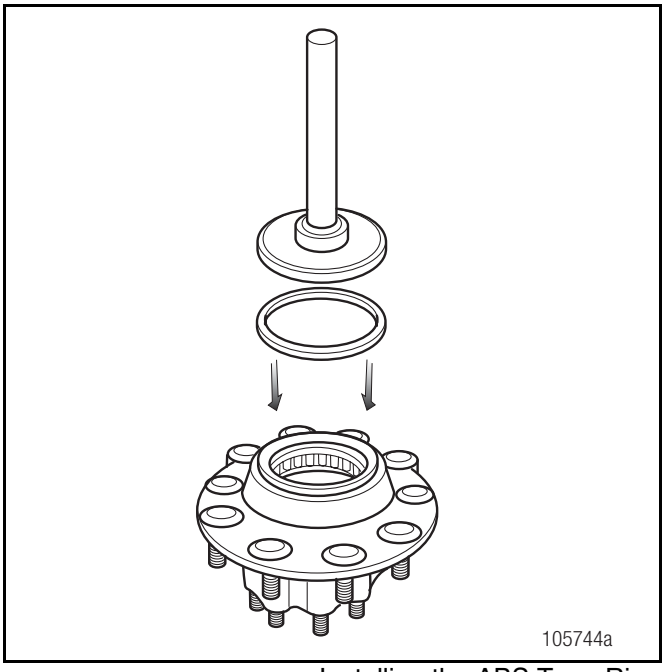
The ABS ring must be fully seated with a maximum of 0.008″ axial runout to ensure the ABS system functions properly.

NOTE

For steer hubs, be certain the inside diameter flange is facing up.

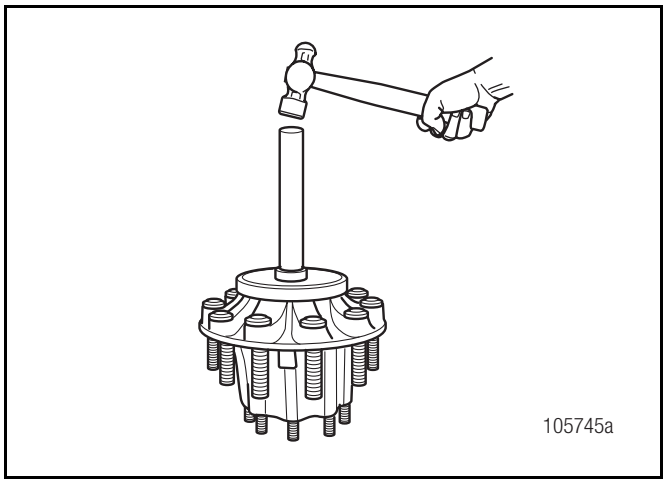
3. Place the hub in a press and place the ABS ring on the hub ring seat.

4. Using ConMet ring installation tool part number 107119, center the tool over the ABS ring. Each type of ring fits a corresponding diameter on the tool (see figure 21).



Installing the ABS Tone Ring
FIGURE 21

5. Press the ring on the hub. If a press is not available, drive the ring on with a hammer or mallet until the ring seats on the hub (see figure 22). A swift initial blow with an 8-lb. hammer may be necessary to start the ring onto the hub.



Using a Hammer to Install the Ring
FIGURE 22

6. Inspect the ring to ensure proper seating. If the ring is not completely seated, continue to drive the ring with the ring installation tool until the ring is completely seated.

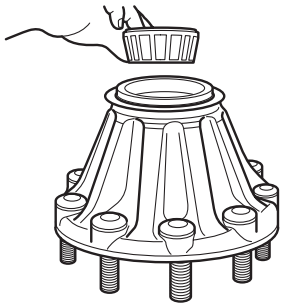
REASSEMBLY

⚠CAUTION

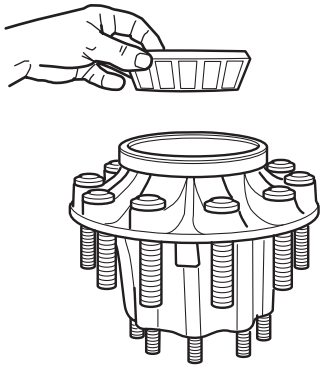
When using an oil bath system, do not pack the bearing with grease. Grease will prevent the proper circulation of axle lubricant and can cause premature wheel seal and bearing failure.

1. Place the hub seal end up on a clean work bench surface.

2. Lubricate the new inner bearing cone with the same lubricant as will be used in the hub and install it into the inner bearing cup (see figure 23 and figure 24).



Bearing Cone Assembly for Steer Hub
FIGURE 23



Bearing Cone Assembly for Drive Hub
FIGURE 24

NOTE

The seal must be replaced every time the hub is removed from the spindle.

Do not apply any gasket sealant to the seal outer or inner diameter.

Always use the seal installation tool specified by the seal manufacturer. Using an improper tool can distort or damage the seal and cause premature seal failure.

3. Lubricate the seal outer diameter and the hub seal bore with the same lubricant as will be used in the hub.

4. Position the seal into the hub bore. Follow the seal manufacturer's installation instructions, including the use of a part specific seal installation tool, if required, to properly install the seal (see figure 25).

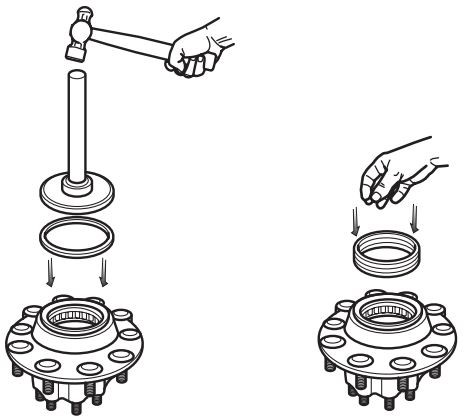


FIGURE 25

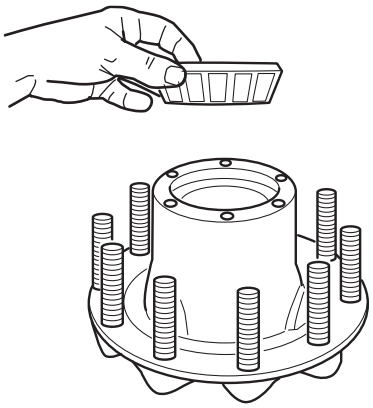
5. Check to be certain the seal is not cocked and that the inner bearing turns freely.

⚠CAUTION

Failure to lubricate the inner diameter of the seal, and the seal journal, may result in premature seal failure.

6. Lubricate the inner diameter of the seal with a light film of the same lubricant as will be used in the hub.

7. Lubricate the new outer bearing cone with the same lubricant as will be used in the hub and install it into the hub assembly (see figure 26).



Installing the Outer Bearing Cone
FIGURE 26

REINSTALLATION

INSTALLING THE WHEEL HUB ASSEMBLY

⚠CAUTION

Care should be taken to avoid damaging the hub or other components.

⚠CAUTION

On the ball seat wheel mounting system, always use left-handed threaded studs, which are gold in color and have an “L” stamped on the end, in the hub on the driver’s side of the equipment, and use right-handed threaded studs, which are silver in color and have an “R” stamped on the end, in the hub on the passenger’s side of the equipment. The ConMet part number is located on the head of the stud. The same part number must be used for replacement unless changing the drum or wheel type.

⚠CAUTION

Failure to apply grease to the bearing journals will result in fretting corrosion, which may result in difficulty removing the bearing. Never support the hub on the spindle with just the inner bearing and seal. This can damage the seal and cause premature failure, i.e., by cocking the seal in the bore.

1. Light corrosion fretting that forms on spindles is normal and should be removed with a fine abrasive. When the residue is cleaned away, the bare spindle is again subject to corrosion and must be covered with a film of grease for corrosion protection, making sure both the bearing journals and the seal journals are well coated. Standard Grade 2 greases work well in normal environments. The lubricant being used in the wheel end may also be used. In severe environments, a Moly-grease may provide added protection.

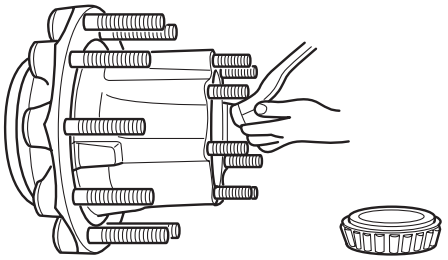
⚠CAUTION

Never support the hub on the spindle with just the inner bearing and seal. This can damage the seal and cause premature failure, i.e., by cocking the seal in the bore.

NOTE

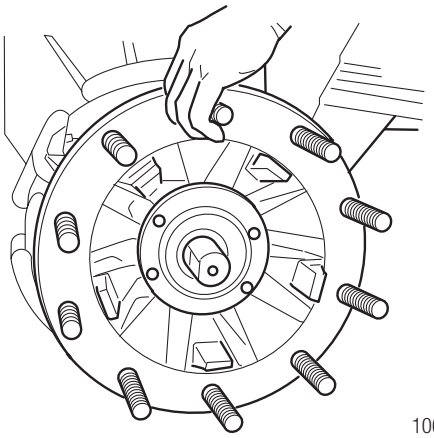
If you are working on a steer or trailer hub, go to step 3. If you are working on a drive hub, proceed as follows.

2. For drive hub installation, place the hub horizontal, and remove the outer cone. Fill the cavity, through the end of the hub with the axle flange studs, with as much oil as possible. Reinstall the outer cone in the hub (see figure 27).



Prelubricating the Drive Hub
FIGURE 27

3. Mount the hub assembly onto the axle spindle with a smooth, firm motion while holding the outer bearing in place. Use care to maintain alignment between the bearing cones and spindle, and to avoid seal damage (see figure 28).



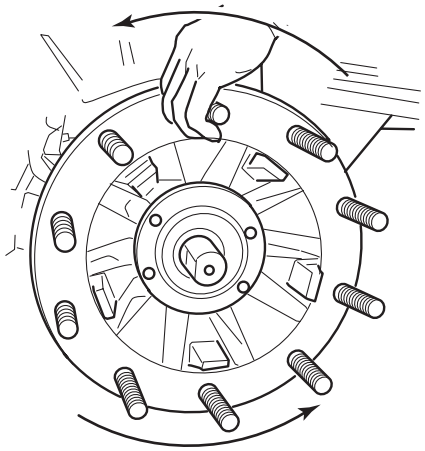
Mounting the Assembly
FIGURE 28

⚠CAUTION

Once the hub is on the spindle, do not remove the outer bearing. Removing the outer bearing may cause the seal to become misaligned, resulting in premature seal failure.

4. Install the axle nut system and adjust the bearings per TMC RP 618 for adjustment recommendations (see figure 29 and “Manual Wheel Bearing Adjustment Procedures” in the Specifications section of this manual). For single-piece nut systems, refer to the manufacturer’s recommended adjustment procedure.

REINSTALLATION



Mounting the Assembly
FIGURE 29

INSTALLING THE HUB CAP

NOTE

The hubcap bolt holes must be free of debris, such as silicone gasket sealer to ensure the bolts will tighten properly to avoid leaks. The vent should also be clean and free of debris. Remove any burrs or sharp edges. Always use new gaskets.

Torque the hubcap bolts to 12-18 ft. lbs., using a star pattern.

NOTE

Use SAE Grade 5 bolts or stronger. Do not use star washers. Use only flat washers or split washers.

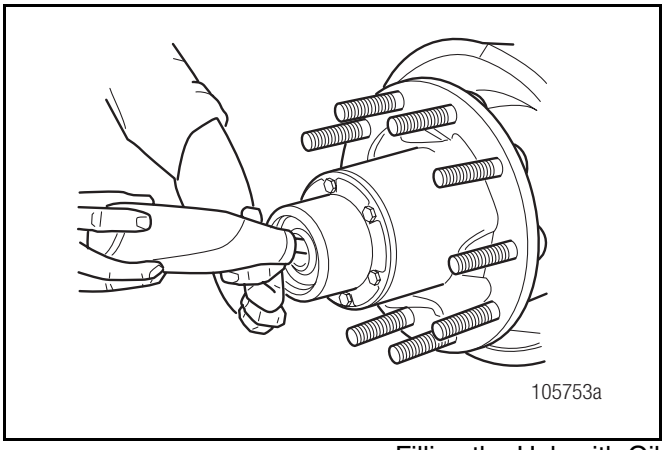
STEER AND TRAILER HUBS WITH OIL LUBRICANT

NOTE

Only use oil approved by the seal manufacturer (see approved list from the seal manufacturer or on www.conmet.com).

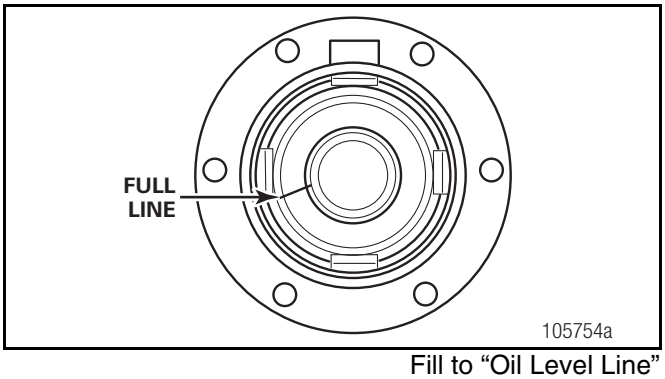
Some hubs are provided with a fill hole, located in the barrel and between the bearings for adding lubricant.

1. Fill the hub through the hubcap or the fill hole with oil. It may be necessary to add lubricant more than once to adequately fill the hub (see figure 30).



Filling the Hub with Oil
FIGURE 30

2. Be certain the hubcap is properly filled to the “oil level” mark on the face of the cap (see figure 31).



Fill to “Oil Level Line”
FIGURE 31

3. Be sure to put the fill hole plug back into the hubcap and that the vent is working properly. Allow the initial fill amount to settle for 10 minutes. Repeat the fill procedure until the oil is at the fill line on the hubcap.

TRAILER HUBS WITH SEMI-FLUID GREASE LUBRICANT

⚠WARNING

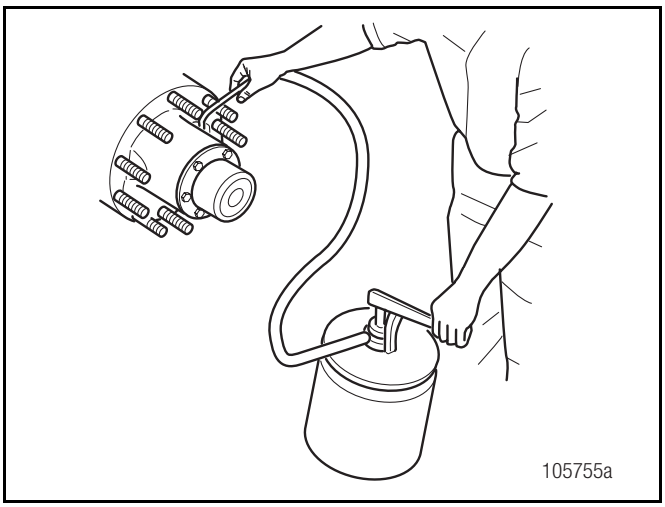
Failure to fill and maintain the hub with the correct amount of semi-fluid grease may cause premature failure of the wheel hub system, bearing failure and possible loss of the wheel.

1. Remove the fill hole plug.

2. Fill the hub with room temperature (60°F minimum) semi-fluid grease through the fill hole in the hub (see figure 32). Refer to TMC RP631 for proper fill amounts.

NOTE

Lubricant and hub should be at 60°F or above for optimum lubrication.



Filling Hub with Semi-Fluid Grease
FIGURE 32

3. Reinstall and tighten the fill plug to 20-25 ft. lbs.

DRIVE HUBS WITH OIL LUBRICANT

1. Drive hubs can be lubricated by installing one pint of oil through the fill plug in the barrel of the hub.

⚠CAUTION

The proper installation torque for the fill plug is 20-25 ft. lbs.

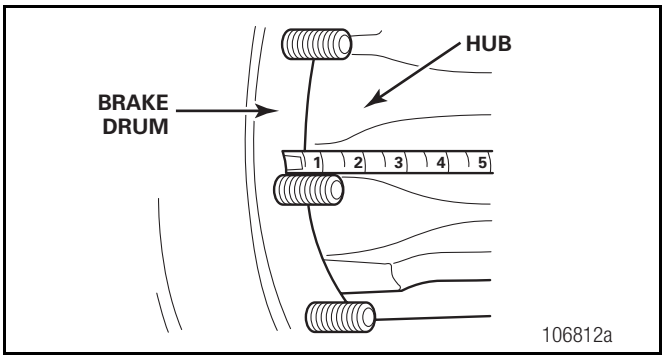
2. If no fill plug is present, the drive hub can be lubricated by lifting the opposite side of the axle 8″ to allow the lubricant to run down the axle housing and into the hub assembly. Elevate the axle for two minutes to allow the lubricant time to fill the hub. Repeat the process for the opposite side of the vehicle. The rear axle carrier should be filled to the proper level to ensure adequate lubricant is available to fill the hub. Refill the carrier to the proper level after this procedure is completed.

REINSTALLING BRAKE DRUMS AND WHEELS

NOTE

If you plan to replace the brake drum (i.e., cast in place of Centifuse™) or wheels (i.e., aluminum in place of steel), measure stud standout (see figure 33). In hub piloted mounting systems, the studs must be long enough for the threads to be exposed beyond the installed wheel nut. In the ball seat mounting system, the stud length beyond the brake drum should be from 1.31-1.44″ as measured from the bake drum to the end of the stud. Call ConMet at 1-800-547-9473 for the correct stud part number for your application.

If you plan to replace the brake drum, verify the new drum has the same drum pilot diameter as the one that has been removed.



Measuring Stud Standout
FIGURE 33

Hub Pilot Wheel Mounting System

⚠CAUTION

The brake drum must be fully seated on the drum pilot and against the hub face during and after installation of the wheel(s).

NOTE

If your shop practice requires the use of lubricant or anticorrosion material to the threads and/or the drum pilot area, avoid getting lubricant on the flat mating surfaces of the hub, drum, and wheels.

1. Remove all foreign material to ensure the drum fits the drum pilot properly and can fully seat against the hub mounting face.

2. In environments where a corrosion inhibitor is beneficial, ConMet recommends the use of Corrosion Block, a product of Lear Chemical Research, (905) 564-0018. In severely corrosive environments, a light coat of Corrosion Block on the drum and wheel pilots has proven beneficial.

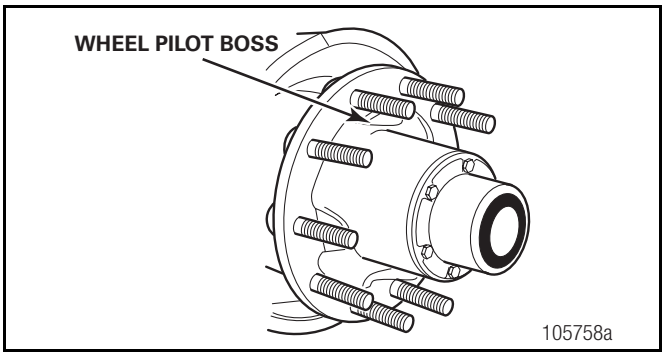
REINSTALLATION

3. In addition to the above preparation, apply two drops of oil to a point between the nuts and nut flange washer and two drops to the last two or three threads at the end of each stud. Also, lightly lubricate the pilots on the hub to ease wheel installation and removal.

⚠CAUTION

Do not get lubricant on the mounting face of the drum or wheel. Failure to clean lubricant from these surfaces may result in decreased clamping load.

4. Before installation of brake drums and wheels that utilize the hub piloted system, rotate the hub so one of the wheel pilot bosses is at the top (12 o'clock position) (see figure 34).

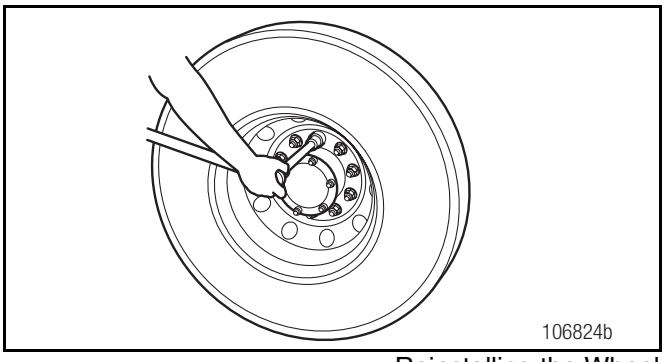


Rotating the Hub
FIGURE 34

5. Position the brake drum over the hub, so it seats on the drum pilot and against the hub face.

6. Place the wheel(s) into position. One or more nuts can be started in order to hold wheel(s) and drum into position.

7. Snug the top nut first. Apply 50 ft. lbs. torque to draw the brake drum up fully against the hub (see figure 35).

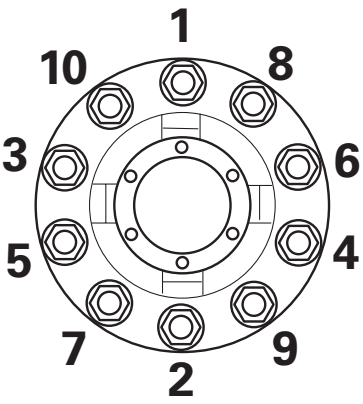


Reinstalling the Wheel
FIGURE 35

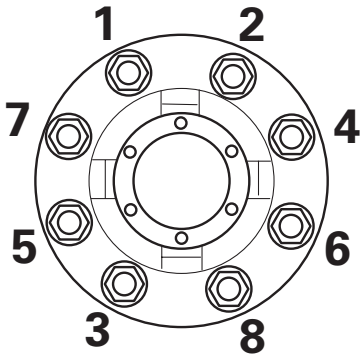
8. Install the remaining wheel nuts and using the sequence as shown, torque all the nuts to 50 ft. lbs., then retorque to 450-500 ft. lbs. (see figure 36 and figure 37). The last nut rotation must be with a calibrated torquing device.

⚠WARNING

Always snug the top nut first to fully seat the brake drum on the drum pilot and against the hub face. See the adjacent diagram for bolt tightening sequence, and tighten in order from 1 through 8 or 10, depending on the bolt pattern (see figure 36 and figure 37).



10 Stud Tightening Sequence
FIGURE 36



8 Stud Tightening Sequence
FIGURE 37

NOTE

Use the appropriate nuts with the above technique to install the front and outer dual wheels. Follow your shop practice to locate the valve stems.

REINSTALLATION

9. Inspect the brake and wheel installation by checking the seating of the wheel(s) and drum at the pilots, and by turning the wheel(s) and checking for any irregularity.

⚠ DANGER

Excessive or inadequate wheel nut torque can cause a failure of the wheel mounting system and a wheel separation resulting in severe personal injury or death and property damage. Always use a device that measures the torque being applied. After the first 50-100 miles, retorque all the nuts to 450-500 ft. lbs. Loosen the outer nuts to retorque the inner nuts.

Ball Seat Wheel Mounting System

Clean all mating surfaces on the hub, drum, wheels and nuts. Remove loose paint, scale, and any material building around the pilots of the drum, hub, and wheels. Be sure paint is fully cured on recently refurbished wheels.

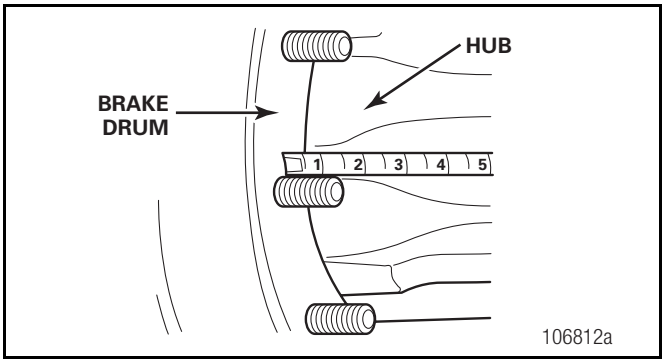
NOTE

When dual wheels are mounted, the stud length beyond the brake drum (standout) should be from 1.31-1.44″ as measured from the brake drum to the end of the stud (see figure 38).

When mounting dual aluminum wheels, use ALCOA inner cap nuts 5978R and 5978L or the equivalent. These nuts can also be used with longer studs up to 1.88″ standout.

For special single aluminum wheel applications on drive and trailer hubs, use ALCOA single cap nuts 5995R and 5995L, or 5554R and 5554L or the equivalent, depending on the stud thread length (see Table A).

For single steel wheel applications, use BATCO 13-3013R and 13-3013L or the equivalent (see Table B).



Stud Standout
FIGURE 38

Table A: Single Aluminum Wheel Applications

Aluminum Wheels	ALCOA Cap Nut Number
3/4-16″ Threaded Studs	5995R and 5995L or 5554R and 5554L, depending on stud length

Table B: Single Steel Wheel Applications

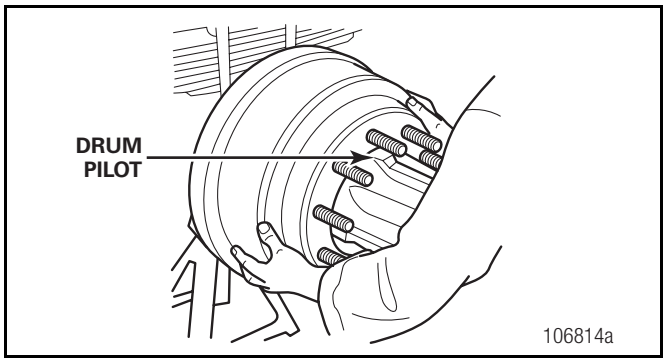
Steel Wheels	BATCO Cap Nut Number
3/4-16″ Threaded Studs	13-3013R and 13-3013L

1. When installing the inner wheel and tire assembly, verify the inner nuts being used are suitable for the application: aluminum wheels, steel wheels, brake drum thickness, etc.

⚠ CAUTION

Inner cap nuts must be deep enough to ensure the stud will not bottom inside the nut and must be of a configuration approved by wheel manufacturer.

2. Rotate the hub to bring a drum pilot to the top (12 o'clock) position (see figure 39). Position the inner wheel and tire assembly over the studs against the drum.

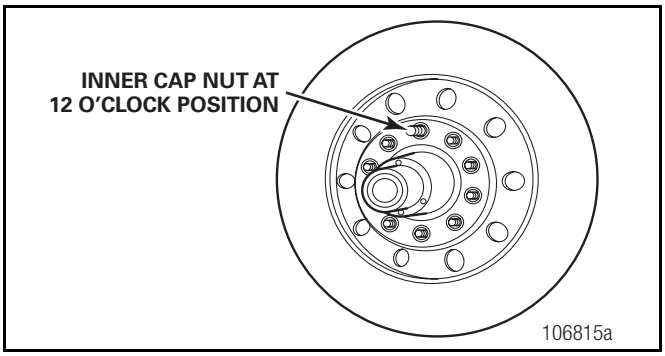


Rotating the Wheel Pilot to 12 O'Clock
FIGURE 39

3. Beginning in the 12 o'clock position, install the inner cap nuts by hand to ensure they are not cross-threaded. Do not tighten any nuts at this time.

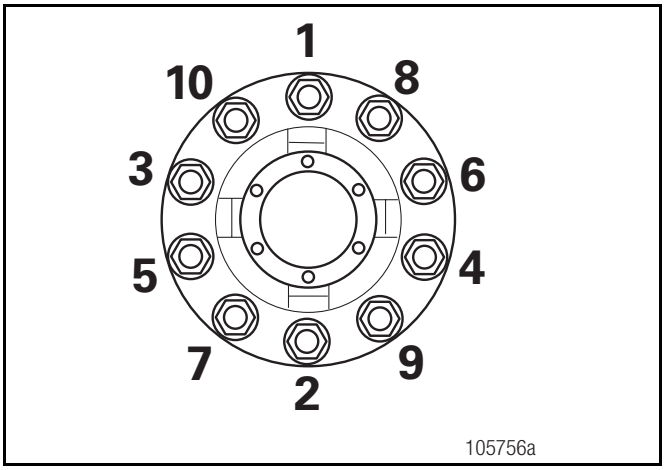
4. Apply sufficient torque (about 50 ft. lbs.) to the inner top cap nut to draw the brake drum up on the drum pilot and against the hub and seat the ball seat of the nut into the ball socket of the wheel (see figure 40).

REINSTALLATION



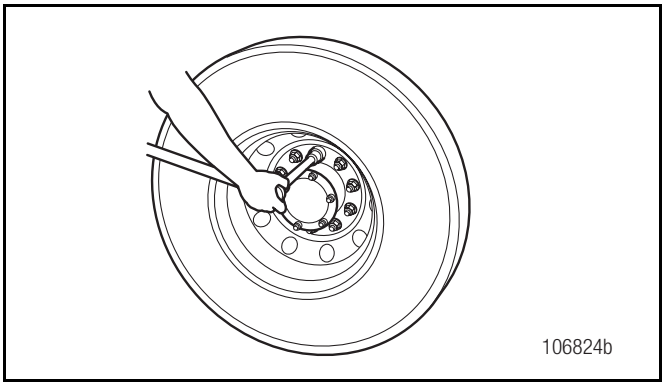
Tightening the Inner Cap Nuts
FIGURE 40

5. To properly center the wheel, snug the remaining wheel nuts. Verify the drum is in place over the drum pilots (see figure 41).



10 Stud Tightening Sequence
FIGURE 41

6. Starting with the top nut first and using a star pattern, torque the inner wheel nuts in stages to 450-500 ft. lbs. (see figure 42). The last nut rotation must be with a calibrated torquing device.

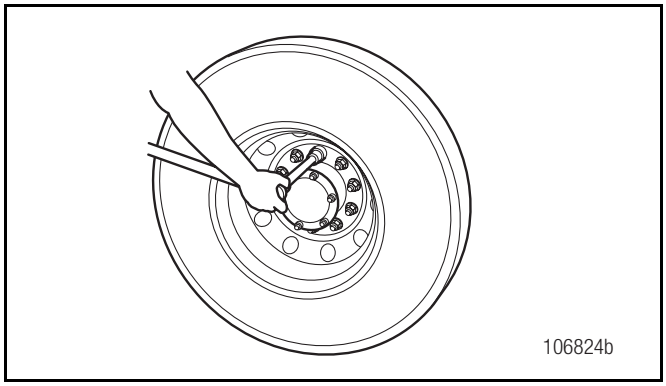


Torquing the Inner Wheel Nuts
FIGURE 42

NOTE

Use the appropriate nuts with the above technique to install the front and outer dual wheels. Follow your shop practice to locate the valve stems.

7. Install the outer wheel and nuts and tighten to 450-500 ft. lbs. (see figure 43). The last nut rotation must be with a calibrated torque device.



Torquing the Outer Wheel Nuts
FIGURE 43

8. Inspect the brake and wheel installation by checking the seating of the wheel(s) and drum at the pilots and by turning the wheel(s) and check for any irregularity.

⚠ DANGER

Excessive or inadequate wheel nut torque can cause a failure of the wheel mounting system and a wheel separation resulting in severe personal injury or death and property damage. Always use a device that measures the torque being applied. After the first 50-100 miles, retorque all the nuts to 450-500 ft. lbs. Loosen the outer nuts to retorque the inner nuts.

SPECIFICATIONS

Wheel End Torque Specifications

Item	Measurement	Torque (ft-lbs)	Notes
Ball Seat Wheel Nut	3/4-16	450-500	Always tighten the top nut first. If lubricant is used, apply sparingly on threads only. Do not lubricate the faces of the hub, drum, wheel, or on the ball seats of the wheel nuts
Hub Pilot Wheel Nut	22 mm x 1.5 mm	450-500	Always tighten the top nut first. Apply two drops of oil between the nut and nut flange, and two or three drops to the outermost 2 or 3 threads of the wheel studs. Lightly lubricate the wheel pilots on the hub.
Drive Studs	3/4-16	70-90	Consult manufacturer's instructions for drive axle shaft installation for all drive studs.
Drive Studs	5/8-18	40-90	
Hubcap	5/16-18	12-18	Minimum SAE Grade 5 fasteners, flat washers only
Oil Fill Plug	1/4 NPT	20-25	—
Oil Fill Plug	3/8 NPT	20-25	—
Oil Fill Plug	9/16-18	20-25	O-ring style
Disc Brake Rotor Screw	M8 x 1.25	18-22	—
Disc Brake Rotor Screw	1/2-20	100-110	—
Disc Brake Rotor Screw	9/16-12	130-150	—
Disc Brake Rotor Screw	5/8-11	190-210	—
Disc Brake Rotor Screw	5/8-18	155-195	—
Disc Brake Rotor Nut	5/8-18	180-210	—
Disc Brake Rotor	M16 x 1.5	190-210	—

SPECIFICATIONS

Manual Wheel Bearing Adjustment Procedure TMC RP618

1. **Lubricate** the bearings with clean lubricant of the same type used in the axle sump or hub assembly.

2. Install the wheel hub and bearing onto spindle and **Torque** the inner adjusting nut to **200 ft-lbs** while rotating the hub assembly.

3. **Back off** the inner adjusting nut one full turn. Rotate the wheel.

4. **Re-torque** the inner adjusting nut to **50 ft-lbs** while rotating the wheel hub assembly.

5. **Back off** the inner adjustment nuts as per chart below.

Axle Type	Threads Per Inch	Final Back Off
Steer (front non-drive)	12	1/6 turn*
	18	1/4 turn*
	14	1/2 turn
	18	
Drive	12	1/4 turn
	16	
Trailer**	12	1/4 turn
	16	

6. **Install** the locking washer.

7. **Install and torque** the outer jam nut as per chart below. (Be sure to install or activate any locking device.)

	Nut Size	Torque
Steer (front non-drive)	No Jam Nut. Install Cotter Pin	
	Under 2-5/8"	200-300 ft-lbs
Drive	Dowel Washer	300-400 ft-lbs
	Tang** Washer	200-275 ft-lbs
Trailer***	2-5/8" and over	300-400 ft-lbs

8. Use a **dial indicator** to verify acceptable end play of .001"-.005".

NOTE

If end play is not within specification, readjustment is required.

* Single nut

** Positive adjustment wheel bearings (a product of Rockwell International), use 250-300 ft-lbs on adjusting nut and jam nut. See Rockwell Field Maintenance Manual No. 14.

***For single axle (13,000-19,000 lb capacity) with tang washers, consult manufacturer's specifications.

This information is intended for reference only. Consolidated Metco does not assume any liability in the event of improper use or mismatch of components. For additional information see ConMet Hub Manual or TMC RP618.

CONMET®

Pointing the Way™

Consolidated Metco, Inc. • P.O. Box 83201, Portland, OR 97283 • (800) 547-9473 • www.conmet.com

Part No. 10008647 Rev A
8-2008 Printed in the USA

ONE OF THE Amsted INDUSTRIES